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DRAFT

"Passive Smoke in the Workplace Guidance Notes for Employers" Workcover Authority of New South Wales 1993

A Critique of the Draft

by

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(15 Pages)

Introduction

The following pages refer to a critical review of the "Guidance Notes for Employers - Passive Smoking in the Workplace - Draft Document" issued by the Workcover Authority, NSW.

HBI was invited by the law firm Clayton Utz to comment on both this document and on the "Draft Code of Practice" itself. As the former contains the latter but not vice-versa the critique focuses on statements in the former.

As arguably the world's most experienced Indoor Air Quality Consultancy group, HBI feels it has an obligation to speak out on any issue concerning Indoor Air Quality (IAQ). It recognises that Environmental Tobacco Smoke (ETS), like many other indoor pollutants such as Asbestos, Radon, Formaldehyde and an ever increasing number of Volatile Organic Compounds (VOC's) sometimes involves heated debate among the scientists and others who study such matters. Having a continuing role as commentators on such issues as VOC's with The National Health and Medical Research Council (NH&MRC) of Australia); Indoor Air Quality Guidelines with The Building Owners and Managers Association (BOMA) of Australia; and Indoor Air Quality Standards (with Standards Australia); HBI attempts to reduce the complexities of such issues to terms comprehensible to both building occupants and building managers alike. Frequently the only other form of information readily available to these people is media hype.

It should be noted that the Draft Code of Practice (page 6) defines the term "environmental or ambient tobacco smoke" as; referring to a combination of side-stream and exhaled mainstream smoke in the atmosphere. It fails to point out the fact that both the side-stream and mainstream smoke are massively chemically modified and diluted in the atmosphere as they leave the burning cigarette end or as the smoker exhales respectively.

HBI trusts this document will shed some light and perhaps a more balanced perspective on this very emotive issue

1 **Page 2, Foreword, Paragraph 3**

"Workplaces are usually enclosed spaces that concentrate smoke"

True only in non-ventilated spaces. However, the Workcover Authority of New South Wales imposes a general duty on an employer to ensure, so far as is reasonably practical, the health, safety and welfare of his employees at work. With the widely recognised dangers of formaldehyde, radon, bio-aerosols, volatile organic chemicals, etc. that accumulate in under-ventilated spaces, the first priority of any employer who wishes to avoid litigation should be to ensure acceptable general ventilation standards, irrespective of the type of ventilation natural or mechanical.

Once Australian Standard ventilation rates are adopted, it is simply not true to state that smoke concentrates in enclosed spaces. Indeed, in any building meeting the minimum ventilation standard for Australia, which allows discretionary smoking, the return air with its complement of smoke constituents is diluted by outside air and passes through a filtration device. Whilst not removing all particulates and gaseous components, it can be stated unequivocally that the diluted and partly filtered air in a building meeting Australian Ventilation Standards as defined in A.S. 1668.2-1991, will meet all National Primary Ambient Standards for outdoor air as defined by the U.S. Environmental Protection Agency, the National Health and Medical Research Council (NH&MRC) of Australia and the World Health Organisation (WHO).

2 **Page 2, Foreword, Paragraph 7**

"The most effective manner in which an employer can fulfil legal obligations to provide a healthy and safe work environment is through the implementation of a non-smoking policy in the workplace"

Wrong, consider the following:

If an occupied area is unventilated, then the air quickly becomes stuffy and stale. Certainly if occupants smoke in such a space, tobacco smoke will accumulate. Moreover, complaints by individuals annoyed by such smoke accumulation can certainly be justified.

Similarly, if a contractor started to paint the walls of the same unventilated space, complaints could be anticipated. Indeed, many mundane activities such as photocopying, duplicating, laser printing, cooking, cleaning, vacuuming, polishing, pesticide spraying, use of perfume etc. would similarly upset a percentage of the room's occupants.

Perhaps a more serious issue for occupants of these under-ventilated spaces is not so obvious. The spread of infectious diseases in poorly ventilated spaces is well documented. Radon - a colourless, odourless and extremely dangerous gas - can be concentrated in such an environment and concentrations of a wide range of volatile organic chemicals invariably increase as the ventilation rates decrease.

An interesting example of the need for optimum ventilation rates would be the hospital operating theatre. Not only are there increased risks of exposure to germs, but the widespread use of anaesthetic gases demands high ventilation rates. Accordingly, it is not unusual for regular checks of ventilation effectiveness to be carried out in operating rooms. One technique involves the release of synthetic smoke. The visible smoke illustrates which air currents convey the air away from the room and indicates the efficiency of pollutant removal. If the smoke lingers, there is good cause for concern. Not only would the germs be trapped, leading to risks of cross infection, but also anaesthetic gases could be trapped with potentially disastrous effects on the operating teams.

By analogy, the visible tobacco smoke in an office demonstrates the ventilating system capability. Excessive smoke accumulation is visible proof of deficiencies of the ventilation system. If such accumulations led to complaints in the past, the quick and easy fix was to ban smoking. However, unless the root cause of the problem was addressed - deficient ventilation capacity - then the quick fix could not have eliminated the more insidious pollutant problems that must still be present in such poorly ventilated areas. In future, litigating attorneys will be quick to grasp the significance of the previous smoking bans. Low cost cosmetic improvements introduced to placate anti-smokers may buy short-term peace of mind. Unfortunately, failure to eliminate the real cause of the problems must eventually come home to roost when more chronic problems of sickness manifest themselves in the poorly ventilated office.

Indeed, the U.S. Environmental Protection Agency (USEPA) headquarters building in Washington, DC illustrates just such a scenario. An inadequately ventilated building trapped all types of indoor pollutants. Early complaints of tobacco smoke accumulations led to smoking bans - much to the delight of many anti-smokers. Within two years of the smoking bans being introduced, eight EPA employees have filed a multi-million dollar lawsuit against the managers of the building alleging toxic exposure to various volatile organic chemicals caused by inadequate ventilation.

It is unfortunate that those managers failed to recognise that the previously trapped smoke was "the canary in the coal mine." Even the anti-smokers amongst the plaintiffs who may now have developed irreversible long term injuries deserve sympathy simply because they failed to identify the true cause of their discomfort. Perhaps worst of all, from the building manager's point of view, is the fact that the prosecuting attorneys now have hard evidence that the building was operating for some considerable time with inadequate ventilation - a system that could not handle smoke could not handle dusts, bacteria, fungi and volatile organic chemicals.

The fact is that properly designed and correctly operated ventilating systems are designed to handle all indoor substances, including smoke. This further illustrates the necessity of addressing any indoor air quality issue with a building systems approach. When complaints about smoking are first voiced, it is incumbent on the management to correctly identify the real problem - generally poor ventilation - and then, only if still necessary, address the issue of smoking. Forward-thinking managers who see the complete picture achieve best results. Complaints need to be correctly understood. Invariably a professionally conducted environmental evaluation of the workplace will identify existing or potential problem areas; attention to faults identified, usually results in dramatically improved air quality; morale improves; productivity increases; and usually the precursor of the problem the smoke accumulation, evaporates.

3 Page 4, Passive Smoking - the Legal Perspective, Paragraph 3

"Employers are required to take every reasonable step to eliminate known hazards from the workplace ... and recent court cases establishing liability with respect to passive smoking ...."

As the response under item 2.0 illustrates, there is a far greater risk of successful court action against employers for violating ventilation codes than against claimed exposure to environmental tobacco smoke (ETS).

Do not be misled by the media hype that attends the isolated, so-called successful, actions against employers on ETS exposure issues. Any settlement or judgement against employers receives enormous publicity and is hailed as a breakthrough which will open the floodgates to further claims. Here are examples of this. First note the absence of media hype to the unsuccessful cases.

3.1 The USA is perhaps the most litigious society on earth. However, within the USA there has not been a spate of ETS litigation against employers. Almost certainly, a reason for this is that the first cases brought were vigorously contested and were not lost by default.

In most states of America, there is legislation which enables individual employees to seek compensation for injuries which they have suffered in the course of their employment. In these cases it is not necessary for the plaintiff to prove fault, so the only issue is causation.

There have been a number of workers' compensation claims brought by employees alleging that they have suffered injury as a result of exposure to ETS. These have nearly all failed where the defendant has contested causation. The main reason for this is that the claimants have had great difficulty in showing that their injury was caused by exposure to ETS in the workplace, as distinct from one of the other possible causes.

For example, in the case of In re Marlene Ritchie (1985), the Oregon Worker's Compensation Board rejected an ETS claim, pointing out that air quality tests showed that the workplace conditions were "in good order", while the coffee shop which the claimant frequented had high levels of formaldehyde, and other substances, which may be detrimental to air quality.

In another case, Kellogg - v - Mayfield (1991), the Ohio court of Appeal upheld the denial of a worker's compensation claim on the grounds that: "the medical evidence indicates that the appellant's condition was just as likely to result from conditions outside the workplace."

3.2 In Australia there have been two cases that were not vigorously defended and went to settlement. In the Carroll case, Mr Carroll was a bus driver who sought workers' compensation for lung cancer, which he claimed was caused by, or at least aggravated by, inhalation of cigarette smoke and exhaust emissions from the bus and air pollution. The case was settled after a three-day hearing for $65,000. The media splashed stories of how Carroll had successfully obtained an award for damages for cancer induced by tobacco fumes from his passengers.

In fact, during the course of the hearing, evidence disclosed that Carroll drove his bus in a separate compartment from the passengers. Moreover, smoking was banned on buses in 1976, twelve years before Carroll's claim for compensation.

A far more likely cause of Carroll's problems, if he was injured at work, would be associated with exhaust fumes. However, the biased publicity encouraged further litigation, including the Scholem - v - Department of Health case.

Mrs Scholem claimed that she suffered from asthma and her condition had been worsened as a result of exposure to ETS at work. The jury found in her favour and awarded $85,000.

The Department of Health called two expert witnesses, Professor Colebatch and Dr McKenzie. Professor Colebatch, who is the Associate Professor of Medicine at the University of New South Wales, gave evidence that there was no scientific material available to support the opinion of the expert witnesses which Mrs Scholem had called to give evidence. Professor Colebatch described Professor Young's (Mrs Scholem's witness) explanation as to how ETS had worsened Mrs Scholem's problems as illogical.

Dr McKenzie, who is a senior staff specialist in respiratory medicine at Prince of Wales and Prince Henry Hospitals, also formed the view that Mrs Scholem's disability was the result of a natural progression of her pre-existing asthmatic condition.

The two experts called by the Department of Health are eminent in their field and of the highest calibre and the jury, for its own reasons, elected to find in favour of the Plaintiff, paying apparently scant regard to these experts.

In addition, it should be noted that the evidence at the hearing showed that Mrs Scholem had

previously worked in places which were large and well ventilated but that at the Ryde Community Health Centre the rooms were small and not air conditioned. Again, it would seem that the real issue is the poor ventilation of the building and not a question of ETS at all.

3.3 In the United Kingdom, there have been two widely media-hyped cases.

The Clay case was against the Department of Social Security. Mrs Clay alleged she was an asthmatic, and on being exposed to colleagues' cigarette smoke she suffered breathlessness and chest pains and had to take time off work to recover. Clay sought State Sickness Benefit under the Social Security Act of 1975 for an "industrial accident".

The Social Security Commissioner judged that Clay had suffered "an accident." He specifically pointed out however that his decision was "no precedent for other cases where it may be alleged that there has been a deleterious effect from the gradual day-by-day process of employees being obliged to inhale other employees' tobacco smoke".

In the Bland case, Ms Bland received 15,000 pounds sterling in an out-of-court settlement with the insurers of her employer, the Stockport Metropolitan Council. She claimed that ETS caused her respiratory condition. This case led to widespread publicity and again the media predicted an avalanche of other suits against people exposed to ETS.

Note:This was an out-of-court settlement and after the publicity about the case, the solicitors for the defendants took the unusual step of issuing a press statement (that was not widely reported) stating that the publicity had given a false impression. They explained that the building in which Ms Bland worked experienced numerous heating and ventilating problems which had an obvious effect on her medical condition.

It is debatable whether this really was an ETS case. Indeed, the original complaint alleged a breach of Section 7 of the 1963 Offices, Shops and Railway Premises Act, which states that "effective and suitable provisions shall be made for securing and maintaining, by circulation of adequate supplies of fresh or artificially purified air, the ventilation of every room comprised in or constituting premises to which the act applies."

i.e. The insurers knew that there were ventilation deficiencies - they took an easy way out in agreeing a settlement. Unfortunately this still leaves them open to more suits from any employee subsequently developing problems whether smoking occurs or not.

4 Recommendation Section, Page 4

"*The most effective and economic manner in which an employer can fulfil legal obligations to provide a healthy and safe work environment is through the implementation of a non-smoking policy at the workplace*"

This is a repeat of item 2, another answer is:

Nonsense, this cannot address all other issues of indoor pollution. There are far more settled, on-going and pending law suits on Sick Building Syndrome throughout the USA alone than there have been ETS suits around the world. As mentioned above, the EPA's own headquarters is implicated in a major law suit ($39 million). This in a building long after smoking bans were introduced.

5 Is a No Smoking Policy Required in all of N.S.W. Workplaces?, Page 4

"*Yes ... There may also be enclosed workplaces which replicate such outdoor conditions as a result of superior ventilation techniques*"

Most existing ventilating systems can provide several advantages over outdoor conditions without so-called superior techniques. Airborne dusts, exhaust emissions, pollens, spores, microbial loads, et. in outdoor air vary widely, as does the temperature and relative humidity. With the advantages of conditioning coils, thermostats, filters, etc. the indoor air can easily be more comfortable and often more healthy than outdoor air, depending on conditions prevailing outdoors.

The fact is that this draft code of practice fails to grasp the basic premise that good ventilating designs are commonplace. Faults develop because building owners, engineers or mangers frequently fail to understand how to operate their equipment, or they attempt to maximise energy savings at the expense of adequate ventilation rates, or they fail to maintain their equipment correctly.

Around the world we have numerous clients who have adopted correct ventilation rates, filtration standards and inspection protocols. Many of these still practice discretionary smoking without complaints or problems. Furthermore, even the US EPA does not demand no-smoking policies. Smoking restrictions yes, but they have repeatedly stated that containment of smokers in designated areas with exhaust to the outside of the building is a satisfactory way of guaranteeing freedom of exposure to non-smoking employees.

This raises the question of how best to accomplish this. The easiest way is to follow the principle of toilet exhausts and surely we do not need to consider toilet exhausts a superior ventilation technique!

Designated smoking lounges simply fitted with exhaust air capability can be designed as per the toilets. The objective is to ensure that the room air, by subjecting it to an exhaust, is maintained at a lower pressure than the adjacent areas. Thus, if one opens the door in a toilet, no germs or odours come out, but adjacent room or corridor air goes in - driven by the pressure differential. Similarly smoke is retained inside the smoking room and is subsequently exhausted to the exterior via the exhaust. The movement of air from other offices or corridors into the smoking rooms (or toilets) is termed transfer air. ASHRAE has for many years been advising engineers to use transfer air in designing smoking lounges.

6 Key Points for Employers, Page 5

6.1 In this section and in other areas of the report the draft states that the most effective manner of dealing with passive smoking is implementation of a no smoking policy as defined in the Draft Code of Practice. The code then states that under specific conditions, designated smoking areas can be acceptable. These two statement are contradictory. The correct wording should be that the most effective manner of dealing with passive smoking is the implementation of restricted smoking policies.

6.2 Item 5 of Page 5 states:

"The protection of non-smokers from the effects of a passive smoking at the workplace is governed by a number of legislative obligations on employers to protect the occupational health and safety of their employees, including:

- *Occupational Health and Safety Act, 1983*
- *Workers' Compensation Act, 1987*
- *Common Law Liability ....."*

This statement equally applies to smokers. Also, each of these legislative obligations apply in the absence of smoking. Under the same Occupational Health and Safety Act 1983 ... employees have an obligation ... it should be noted that all humans shed skin scales, bacteria, we cough, sneeze and give off volatile organic chemicals etc. In addition we use copiers "white-out" correction fluids, we install carpets, adhesives etc. etc. If management fails to provide adequate ventilation, any of these actions could be constructed as adversely affecting the comfort, health and well being of other

employees. The code should be the driving force in helping to deal with all indoor pollutants, not just tobacco smoke.

7 Key Points for Employees, Page 6, Bullet Point 2

It is impossible to *"demonstrate that these alternatives (i.e., superior ventilation) are equal to, or exceed, the level of health and safety achieved through a non-smoking policy"*

No authority in the world understands the health risk of the vast majority of chemicals, bio-aerosols, dusts, etc. present in the indoor air. Is a non-smoking building which is contaminated with fungus and legionella species of bacteria, volatile organic compounds healthier than any other building? Are either of these better or worse off than a building having a smoker? etc., etc.

We can state unequivocally that any major building that adopts good ventilation practices - with or without smoking - is less likely to have air quality problems than a smoke-free building that fails to practice good ventilation.

Note: this answer also addresses the same statement occurring in the penultimate paragraph of page 7 under the title "Alternative Procedures".

8 Where Do I Begin - The Hierarchy of Controls, Page 8

8.1 *"With passive smoking, as well as other health and safety issues, a range of methods may be used to control workplace hazards."*

Source control was identified as the number one item. Engineering, e.g., "superior ventilation" was last at number 3.

It appears that this Draft Code of Practice wishes to replicate the early errors of the US EPA. It used to pursue a policy of source control and "dealt" with formaldehyde, asbestos, radon, ETS, even carpet emissions using a source control approach. Then, in 1990 its publication, "Research Needs Section (Vol III)" of its report to Congress, the EPA noted, "More can be done to reduce overall exposures and risks by altering building designs and ventilation patterns than by approaching the problem source-by-source or pollutant-by-pollutant." See HBI's recommendations on a Building Systems Approach below.

8.2 Under (i) Eliminate

"A total ban on smoking at the workplace avoids the costs of the following in expenditures on superior ventilation."

This, of course, is the fundamental error in the philosophy of the draft code. If a ventilation system cannot manage a moderate amount of passive smoke, it certainly cannot control VOCs, microbes or other hazardous pollutants. By inferring that a simple smoking ban obviates the need for efficient ventilation, this Draft Code of Practice could be cited as subsequently being a contributing factor when employees become injured from other indoor pollutants.

Consider the following statement by Helen Eisenstein Zukin in the Indoor Pollution Law Report dated December 1992 under the heading "Why Sick Building Syndrome Suits Could Spin a Web of Liability":

"If an engineer fails to design a system in conformity with the appropriate ASHRAE (or other relevant) ventilation standards, his or her ability to defeat a negligence claim will be virtually impossible." ("Or other relevant" added by author.)

8.3 Under Factors to be taken into account with a total ban are:

- Possible loss of valuable personnel
- Possible loss of clients

This should be expanded to consider the following:

Smoking restrictions in buildings have been part of the Australian way of life over the past few years, however only recently have we seen a move to eliminate smoking entirely from office buildings. This has led to the somewhat pathetic sight of groups of smokers huddled in front of entrances of major buildings in the central business districts of many major Australian cities. Many property management and employer clients have been distinctly unhappy with this arrangement. They worry about;

- Productivity - smokers are walking long distances to take a smoking break, staying away from their work stations longer than if they had somewhere to smoke on their own floor.
- Security - It is dangerous for women especially to be hanging around on city streets, especially after dark, in many major cities. Bear in mind that they are not there exactly of the own volition.
- Public Image - Many employers and facility managers find the sight of individuals loitering around the front entrance of their properties to be inconsistent with the image of a productive and efficient company. Indeed, foreign visitors to one major corporation sympathised with management that they must have severe industrial relations problems in view of the picket line outside the entrance!
- Litter - The pavements outside the front entrances of most buildings are not equipped with facilities for smokers, which adds to the public image problem above.
- Also, especially when dealing with large numbers of the public (e.g. airports), groups of smokers outside entrances have to be negotiated by building users and non-smokers are involuntarily exposed to smoke - an option they can avoid if the smokers were grouped in properly designed lounges inside the building.

9 Designated Smoking Areas

We have already criticised the philosophy of the code but also add that the Draft Code's statement that external smoking areas outside of buildings is a popular option is unsupported by any evidence within the USA, England and Australia.

Perhaps the most constructive thing we can do is outline the options which HBI recommend for inclusion in the Draft Code.

Smoking Policy Options

In all areas where national or local governments have enacted laws and regulations prohibiting and/or restricting smoking, then such laws should be obeyed. Also, smoking should be prohibited near flammable materials, in areas where employees handle hazardous substances, in food preparation areas, and in close proximity to sensitive machinery or equipment. In most other areas, a common-sense approach to the issue of smoking policies is of paramount importance.

Since we are dealing with a wide variety of individuals working in a multiplicity of different buildings, it is inevitable that there is no one formula that satisfies all people at all times. We suggest therefore the introduction of a step-wise series of options moving from the current practice to an informal policy of

accommodation through progressively more restrictive options up to a dedicated smoking area physically separated from the non-smoking area using a separate exhaust ventilation system. The latter option ensures that no non-smoking employees need be exposed to other people's smoke in their normal work environment.

Status Quo

In buildings that have adequate ventilation and those experiencing no significant complaints of air quality issues including tobacco smoke - why change? Discretionary smoking is practiced in many buildings. In such buildings that meet or exceed the ventilation rates of A.S. 1668.2-1991, complaints are rare.

Many buildings using A.S. 1668.2-1991 minimum ventilating standards, with or without dedicated smoking areas, practice acceptable air quality procedures. Return air from discretionary smoking areas or designated smoking areas, when ducted to the HVAC systems, can be filtered and diluted to such an extent that it meets the A.S. 1668.2-1991 definition of acceptable outdoor air. Since this standard is based on the National Primary Ambient Air Quality Standards for outdoor air as set by various regulatory authorities, including the U.S. EPA, WHO, and the NH&MRC of Australia, it is inconceivable that such supply air to the building could be judged to be unacceptable. In essence, if the filtration and dilution process provides supply air quality equivalent to the outdoors - so-called fresh air - then no further refinement should be judged necessary.

Designated Smoking Areas

With some thoughtfulness in the selection of the smoking area with respect to prevailing ventilation conditions, the policy of designated smoking areas works very satisfactorily.

Physical grouping of smokers and non-smokers in discrete areas frequently obviates the concern of sensitive non-smokers. In doing so, it is important to utilise the prevailing air currents and routes of supply and exhaust of air. Whenever feasible, the smoking area should be concentrated nearer the exhaust grilles with the non-smokers closer to the supply grilles. Providing the exhaust systems area sized properly, such an arrangement will ensure that the air movements will be diverted from non-smoking areas to smoking are and then to room exhaust. This minimises the migration of tobacco smoke from smoking to non-smoking areas. Thereafter, the exhaust air should exit the building or, provided it is filtered and diluted to meet nationally agreed outdoor air quality standards, it can be recycled via the air supply system.

Air Cleaning Equipment

In designated smoking areas, supplementary air cleaning offers some worthwhile advantages. Equipment marketed specifically for the removal of tobacco smoke components from room air includes electrostatic precipitators, activated charcoal filters and high efficiency filters such as HEPA filtration units. All three have their place in removing substances from the air. The electrostatic precipitators and HEPA filters are very efficient at removing the fine so-called respirable suspended particulates (RSP) from the air. Correctly sized, well-serviced electrostatic precipitators or HEPA filters can remove 90 to 98 percent of these airborne particles. Neither of these filters, however, can remove gaseous components. Here we need the use of adsorbent filters using activated charcoal, potassium permanganate impregnated aluminium oxide pellets or other proprietary adsorbents. These, again presupposing they are sized correctly and serviced regularly, can remove substantial amounts of unpleasant odours, gases, nicotine, etc.

The most effective devices for removing perceived signs (olfactory or visual) of tobacco smoke appear to be a combination of a "roughing" filter followed by an electrostatic precipitator or HEPA unit, followed by an adsorbent filter. Several proprietary designs of this combination are readily available worldwide. The combination of separate smoking and non-smoking areas coupled to the use of supplementary filtration in the smoking sections and presupposing adequate ventilation rates, i.e. A.S. 1668.2-1991 rates, is usually more than adequate to reasonably satisfy both smokers and non-smokers.

Design of Smoking Lounges

Dedicated smoking lounges can be set up in most buildings whether naturally or mechanically ventilated. The specification of a separate ventilating system is accomplished by providing the designated lounge with a local exhaust ventilating system.

The A.S. 1668.2-1991 suggested ventilation rate for a dedicated smoking lounge is 25 L/sec/person based on an occupancy rate of approximately 1.5 square metres per person. This equates to 17 L/sec of exhaust air per square metre of lounge area. In sizing a dedicated smoking lounge, multiply the area of the lounge in square metres by seventeen to yield the required capacity of the exhaust fan in litres per second.

In retrofitting an existing office or room to function as a smoking lounge, the following steps are suggested:

- For a mechanically ventilated building, check the air handling system's ability to meet any increase in the volume of supply air to balance the increase in exhaust air from the proposed smoking lounge(s). Modify systems if necessary.
- Disconnect and seal off any existing return air grilles in the proposed smoking lounge;
- Install, preferably in a central location of the smoking lounge ceiling, a designated exhaust grille connected to an exhaust fan rated as described above;
- The discharge should be ducted to any existing exhaust shafts or when feasible, directly through the wall or roof to the exterior of the building. Most authorities permit linking some dedicated exhaust systems together in a common duct, but individual building owners should check their local authority for regulations to avoid contravening local building codes.
- In the case of heavy utilisation of the smoking lounge, it would be prudent to install supplementary filtration in the lounge. High efficiency media filters or electrostatic precipitators are recommended. The capacity of such room filters should be selected to ensure that the total volume of room air is filtered every five minutes.

  i.e. Minimum L/sec requirement of filter = Volume of Room (m^3) x 3.3

- In providing exhaust air capacity at a rate of 17 L/sec/m^2, the smoking room will develop a negative air pressure with respect to adjacent areas. Thus air flow will be from the adjacent areas into the smoking room, precluding the release of smoke out into the adjacent areas. The movement of air from the higher pressure areas to the negative pressure areas is defined as transfer air. The use of transfer air for smoking lounges, toilets, etc. is recommended to preclude the movement of annoying odours and other noxious substances into other occupied areas.
- In commissioning smoking lounges in an air conditioned building the air supply systems should be re-balanced to ensure correct ventilation to all areas.

10 Engineering - Provide Air Conditioning System, Page 9

"An essential problem emerges in regard to providing adequate ventilation. Many buildings and ventilation systems were designed and built well before passive smoking was seen to be associated with short and long term health effects"

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There are many other pollutants inside all buildings that must be dealt with by ventilation. Many volatile organic compounds (VOCs) are listed as known or probable human carcinogens. Microbes are known to cause infections or allergies, etc. All are generally adequately catered for by traditional ventilation systems. Smoke is relatively easy to handle and needs no special consideration. Indeed, as prior statements in this response indicate, if the system cannot accommodate a moderate amount of smoking, then beware. An insidious and potentially more hazardous condition could well be accumulating within the structure. Remember, this is precisely what happened at the EPA's headquarters in the USA.

Also, contrary to the statement that suspended particulate matter in tobacco smoke is not removed by filtration, we can attest to the fact that many commercial office buildings in Australia and elsewhere employ filters that remove substantial portions of the particulate matter. Since the air is constantly recycled, filtered and diluted in each building many times per day, the particulate levels and gaseous components of tobacco smoke are effectively reduced. Indeed, as we have stated several times, the air supply after filtration and dilution in buildings adopting good ventilation and filtration standards can be significantly better than outdoor air despite the presence of smoking activities. However, this point becomes moot if designated smoking areas are employed with exhaust to the exterior.

11 BOMA Australia - Management Indoor Air Quality - Interior Guidelines, April 1992, Page 10

The Draft Code refers to the helpful comments from BOMA:

- Install better filters
- Clean out HVAC systems
- Increase outdoor air rates
- Relocate fresh air intakes away from exhausts

It then warns readers that these control measures will not be achieved without additional expense.

While there may be a small incremental cost incurred in improving filters, boosting ventilation rates, etc., the return on such investment will be tremendous. It annually costs less than $50 per square metre of building to provide adequate ventilation rates, filtration standards, etc. for a commercial building. However, it costs $3,000 minimum per square metre to staff the buildings. If increasing the maintenance costs by a few percent helps reduce absenteeism or improve productivity, it inevitably turns out to be a substantial saving in overall operating budgets - not an added cost.

This message should be used to educate all building owners or managers rather than leaving them with the impression that optimising ventilation means added costs.

12 Key Questions, Page 11, First Section

Has it been proved that passive smoking is dangerous to health:

"The International Agency for Research on Cancer, an agency of WHO, lists tobacco smoke as a group 1 carcinogen"

Let's assume that ETS is such a carcinogen. Worksafe Australia, or the Occupational Safety and Health Administration of the USA, has lots of experience in dealing with carcinogens in the workplace. Both use Threshold Limit Values (TLV) or Permissible Exposure Limits (PEL) usually defined as averages over eight-hour periods. Concentrations of substances, including carcinogens at lower concentrations than these TLVs or PELs are considered to be acceptable.

For example, let's look at a commonly occurring class A carcinogen - benzene. The TLV or PEL is set at 1 ppm. In studies published by Samet and Spengler in their book, Indoor Air Pollution - A Health Perspective (John Hopkins University Press, 1991), these authors - both anti-smokers - drew attention to the fact that there was more benzene in the smoking home than a non-smoking home and we accept that probability. However, they reported concentrations thus:

	Average Benzene concentration (ppm)
Smoking homes	0.0035
Non-smoking homes	0.0023

This is a difference of 0.0012 ppm, about one one thousandth part of the TLV/PEL.

Far more relevant is the fact that HBI has studied, over 225 offices, allowing smoking, for benzene and used 225 non-smoking offices as controls. HBI's results:

	Average Benzene concentration (ppm)
225 non-smoking offices	0.0010
225 smoking offices	0.0015

Note: From the two tables, the average non-smoking home contains more benzene than the average smoking office.

The fact is that benzene is a common carcinogen. In the home it is present in all sorts of waxes, polishes, sprays and cleaning compounds. It is present in adhesives and in glues used for hobbies, etc. The significant difference is that homes usually have no dedicated ventilating system, when even poorly ventilated offices still have mechanical capability and that is why more of this carcinogen accumulates in homes than in offices, even the smoking offices.

This is not just work done by HBI. Holcomb, a U.S. Scientist, has investigated every North American published study of indoor benzene levels. He found that the average readings in smoking and non-smoking offices in North America fall very much in line with the figures quoted from HBI's studies. There is a marginal increase in the smoking office over the non-smoking office but the very important thing is that there is more benzene in the homes than in the offices and even more in vehicles.

Consider one more class A carcinogen - asbestos. OSHA, the US Occupational Health and Safety Administration has a permissible exposure limit of 0.2 fibres per cc of air. What does this mean? If we consider a 10,000 square meter building - this would be a typical ten storey building - we can look at what the volume of that building might be and translate it into cc's (cubic centimetres). We have over 28 million cubic centimetres in that building. At 0.2 fibres per cc, the Permissible Exposure Limit is 5.6 million fibres. Thus you could point out that at 5 million fibres of airborne asbestos, that building would be judged as acceptable. Almost ironically, allow a few molecules of environmental tobacco smoke in the building, and some would claim that the buildings are not inhabitable. These priorities appear sadly wrong.

13 Conclusions

"The Workcover Authority of NSW recommends that this Draft Code of Practice on Smoking in the Workplace should be used with other preventative strategies to improve the quality of air in the workplace" and "The Authority can provide a range of advice to employers on preventative strategies for other airborne contaminants ..." (Page 9 of Draft Code of Practice). HBI strongly suggest that no other strategy comes close to the Buildings Systems Approach already defined for the most effective means of dealing with all airborne pollutants

The fact is that properly designed and correctly operated ventilating systems are designed to handle all indoor substances, including smoke. This further illustrates the necessity of addressing any indoor air quality issue with a building systems approach. When complaints of smoking are first voiced, it is incumbent on the management to correct the real problem - usually poor ventilation - and then, only if still necessary, address the issue of smoking. Forward-thinking managers who see the complete picture achieve best results. Complaints need to be correctly understood. Invariably a professionally conducted environmental evaluation of the workplace will identify existing or potential problem areas; attention to faults identified usually results in dramatically improved air quality; morale improves; productivity increases; and usually the precursor of the problem, the smoke accumulation evaporates.

Optimisation of the Workplace - Building Systems Approach

In the future it is inevitable that some form of regulation will be required to control indoor air quality as a whole. In a 1987 report "Policies & Procedures for Control of Indoor Air Quality", the National Research Council (NRC) in the USA concluded that the levels of both chemical and biological contaminants were strongly associated with the cleanliness of the heating, ventilation and air-conditioning system. They also noted the complex nature of the indoor air and the difficulties of identifying sources of pollution and suggest that solutions can usually be implemented without such identification.

With the aim of improving comfort, productivity and attendance, forward-thinking managers are finding it cost effective to optimise the workplace from an environmental perspective. The approach is applied to both existing and planned buildings in order to prevent problems rather than attempting to cure problems after the fact.

A large body of experience has demonstrated that a building systems approach is the most effective, practical path for a comfortable and productive indoor environment. When buildings are operated and maintained to these standards, complaints are indeed rare and smokers and non-smokers can usually coexist in harmony.

The cornerstone of this approach is to design, operate and maintain a building to specified minimum environmental guidelines. Since the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) has already published appropriate guidelines, some of which are recognised in equivalent Australian Standards, HBI support and encourage the use of these specific publications:

ASHRAE Standard 62-1989, "Ventilation for Acceptable Indoor Air Quality", a precursor of Australian Standard A.S. 1668.2-1991

ASHRAE Standard 55-1992, "Thermal Environmental Conditions for Human Occupancy"

ASHRAE Standard 52-1968 (RA 76) (Reaffirmed 1976), "Method of Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter"

ASHRAE Guideline 1-1989, "Commissioning of HVAC Systems"

ASHRAE Guideline 4P exists in the form of public review draft dated 1992,"Preparation of Operating and Maintenance Documentation for Building Systems.

With the comfort of employees at stake and the prospects of increased absenteeism, plus a loss in productivity, forward-thinking employers are finding it cost effective to ensure that indoor air quality and employee welfare are maintained. This approach is an important management tool that should be applied to both existing and planned buildings to prevent problems rather than attempting to cure them once they happen.

Adopting the building systems approach begins with adopting a ventilation standard similar to that established by A.S. 1668.2-1991. These standards were developed as consensus documents and were based on "real life" feedback from architects, engineers, consumer organisations, health officials, medical researchers, building owners and operators. Their experience showed that 10 litres per second of outside air per person in an office setting was effective in controlling indoor pollution. This value was chosen to control carbon dioxide and other contaminants with an adequate margin of safety and to account for health variations among people, varied activity levels, and a moderate amount of smoking.

The second focus of the building systems approach is the correct selection of air filters in commercial buildings. Again, ASHRAE has identified a suitable starting point. Filters having a minimum efficiency of 40 - 60 percent as measured by the ASHRAE 52-76 Atmospheric Dust Spot Standard should be installed. This is approximately the same as 40 - 60 percent in accordance with A.S. 1132 using Test Dust #1. These filters should be carefully fitted and routinely serviced.

The third step is provision for regular, not less than annual, inspections of the air handling system equipment of commercial buildings to ensure cleanliness and proper operation. These inspections should include as a minimum:

- internal chambers of each air handling unit;
- coils and drain pans
- internal insulation of chamber walls
- humidifier sprays and reservoirs
- internals of main air supply ducts

Inspections should also include verification of compliance with proper schedules of filter changes and general maintenance standards of ventilation equipment.

As stated previously a large body of experience has demonstrated that a Building Systems Approach to indoor air quality is the most effective, practical and economic path for comfortable and productive indoor environment. When buildings are operated and maintained to this standard, complaints are indeed rare and smokers and non-smokers can usually coexist in harmony.